CLAIMS

What is claimed:

1. A microelectronic package, comprising:

a die; and

a heat spreader coupled to the backside of the die, the heat spreader including a plurality of pillars surrounding the die to shift thermally induced stress away from the corners and edges of the die to the pillars of the heat spreader.

2. The microelectronic package of Claim 1 wherein the heat spreader is fabricated from a material having a coefficient of thermal expansion substantially equivalent to a coefficient of thermal expansion of the die.

3. The microelectronic package of Claim 1 wherein the heat spreader is coupled to the die using heat conductive adhesive.

4. The microelectronic package of Claim 1 wherein the plurality of pillars surrounding the die protect the corners and edges of the die from cracking due to thermally induced stress.

5. A microelectronic package, comprising:

a die affixed to a carrier substrate; and

a heat spreader coupled to the backside of the die, the heat spreader including a plurality of pillars surrounding the die to shift thermally

induced stress away from the corners and edges of the die to the pillars of the heat spreader.

6. The microelectronic package of Claim 5 wherein an active surface of the die is affixed to an active surface of the carrier substrate, a plurality of solder balls disposed on an active surface of the die aligned with a plurality of bond pads disposed on an active surface of the substrate.

7. The microelectronic package of Claim 5 wherein the substrate is fabricated from organic or ceramic material.

8. The microelectronic package of Claim 5 wherein the heat spreader is fabricated from a material having a coefficient of thermal expansion substantially equivalent to a coefficient of thermal expansion of the die.

9. The microelectronic package of Claim 5 wherein the heat spreader is coupled to the die using heat conductive adhesive.

10. The microelectronic package of Claim 1 wherein the plurality of pillars surrounding the die protect the corners and edges of the die from cracking due to thermally induced stress.

11. The microelectronic package of Claim 5 wherein a through-hole extends from a first exterior surface to a second exterior surface of the substrate,

the through-hole configured to allow the flow of an underfill encapsulation material into a gap between the die, the substrate, and the heat spreader.

12. The microelectronic package of Claim 11 wherein a vent hole extends from a first exterior surface to a second exterior surface of the substrate, the vent hole configured to allow air to escape from between the die, the substrate, and the heat spreader as the underfill encapsulation material is dispensed via the through-hole.

13. The microelectronic package of Claim 5 wherein a through-hole extends from a first exterior surface to a second exterior surface of the heat spreader, the through-hole configured to allow the flow of an underfill encapsulation material into a gap between the die, the substrate, and the heat spreader.

14. The microelectronic package of Claim 11 wherein a vent hole extends from a first exterior surface to a second exterior surface of the heat spreader, the vent hole configured to allow air to escape from between the die, the substrate, and the heat spreader as the underfill encapsulation material is dispensed via the through-hole.

15. The microelectronic package of Claim 5 wherein mechanical reinforcements connect the substrate and the heat spreader.

16. A process of fabricating a microelectronic package, comprising:

providing a die; and

coupling a heat spreader to one side of the die, the heat spreader including a plurality of pillars surrounding the die to shift thermally induced stress away from the corners and edges of the die to the pillars of the heat spreader.

17. The process of Claim 16 wherein coupling of the heat spreader to one side of the die comprises providing a heat spreader fabricated from a material having a coefficient of thermal expansion substantially equivalent to a coefficient of thermal expansion of the die.

18. The process of Claim 16 wherein the coupling of the heat spreader to one side of the die comprises affixing heat conductive adhesive between the backside of the die and the heat spreader.

19. A process of fabricating a microelectronic package, comprising:

providing a die affixed to a carrier substrate; and

coupling a heat spreader to the backside of the die using heat conductive adhesive, the heat spreader including a plurality of pillars

surrounding the die to shift thermally induced stress away from the corners and edges of the die to the pillars of the heat spreader.

20. The process of Claim 19 wherein providing the die affixed to the carrier substrate comprises a die affixed to the substrate with a plurality of solder balls disposed on an active surface of the die aligned with a plurality of bond pads disposed on an active surface of the substrate.

21. The process of Claim 19 wherein providing the die affixed to the carrier substrate comprises providing a carrier substrate made of organic or ceramic material.

22. The process of Claim 19 wherein the coupling of the heat spreader to the backside of the die comprises providing a heat spreader fabricated from a material having a coefficient of thermal expansion substantially equivalent to a coefficient of thermal expansion of the die.

23. The process of Claim 19 further comprising the dispensing of an underfill encapsulation material via a through-hole extending from a first exterior surface to a second exterior surface of the substrate, the underfill encapsulation material flowing into a gap between the die, the heat spreader, and the substrate.

24. The process of Claim 23 wherein the dispensing of the underfill encapsulation material via the through-hole includes the release of air from between the die, the substrate, and the heat spreader through a vent hole in either the substrate or the heat spreader.

25. The process of Claim 19 further comprising the dispensing of an underfill encapsulation material via a through-hole extending from a first exterior surface to a second exterior surface of the heat spreader, the underfill encapsulation material flowing into a gap between the die, the heat spreader, and the substrate.

26. The process of Claim 25 wherein the dispensing of the underfill encapsulation material via the through-hole includes the release of air from between the die, the substrate, and the heat spreader through a vent hole in either the substrate or the heat spreader.

27. The process of Claim 19 further comprising the attaching of mechanical reinforcements between the substrate and the heat spreader.

28. A process of fabricating a microelectronic package, comprising:

providing a die affixed to a carrier substrate;

coupling a heat spreader to the backside of a die using heat conductive adhesive, the heat spreader including a plurality of pillars

surrounding the die to shift thermally induced stress away from the corners and edges of the die to the pillars of the heat spreader; and

injecting an underfill encapsulation material into a gap between the die, the substrate, and the heat spreader.

29. The process of Claim 28 wherein providing the die affixed to the carrier substrate comprises the die affixed to the substrate with a plurality of solder balls disposed on an active surface of the die aligned with a plurality of bond pads disposed on an active surface of the substrate.

30. The process of Claim 28 wherein coupling the heat spreader to the backside of the die comprises providing a heat spreader fabricated from a material having a coefficient of thermal expansion substantially equivalent to a coefficient of thermal expansion of the die.

31. The process of Claim 28 wherein injecting the underfill encapsulation material into the gap between the die, the heat spreader, and the substrate comprises injecting the material into a through-hole extending from a first exterior surface to a second exterior surface of the substrate.

32. The process of Claim 31 wherein dispensing the underfill encapsulation material via the through-hole further comprises the release of air from between the die, the substrate, and the heat spreader through a vent hole in either the substrate or the heat spreader.

33. The process of Claim 28 wherein dispensing the underfill encapsulation material into the gap between the die, the heat spreader, and the substrate comprises injecting the material into a through-hole extending from a first exterior surface to a second exterior surface of the heat spreader.

34. The process of Claim 33 wherein dispensing the underfill encapsulation material via the through-hole further comprises the release of air from between the die, the substrate, and the heat spreader through a vent hole in either the substrate or the heat spreader.

35. The process of Claim 28 further comprising attaching mechanical reinforcements between the substrate and the heat spreader.